REMARKS

Applicant has studied the Office Action dated September 19, 2007. Claims 1-7, 9-17, 19, and 21 are pending. Claims 1-7, 9-17, 19, and 21 have been amended and claims 8, 18, and 20 have been canceled without prejudice. Claims 1, 5, 17, and 19 are independent claims. No new matter has been added as the amendments have support in the specification as originally filed.

It is submitted that the application, as amended, is in condition for allowance. Reconsideration and reexamination are respectfully requested.

Amendments to Specification

With this paper, a substitute specification, excluding claims, has been submitted in order to more clearly disclose the invention and to correct informalities that are the basis for objections to the specification. Pursuant to 37 CFR 1.125(b), a clean copy of the substitute specification and a marked-up copy of the substitute specification have been submitted, the marked-up copy indicating the matter being added to and deleted from the specification of record. The substitute specification includes no new matter as the additions to the specification of record have support in the specification as originally filed.

Claim for Foreign Priority under 35 U.S.C. § 119

The Examiner acknowledged the Applicant's claim for foreign priority under 35 U.S.C. § 119(b) and indicated that a certified copy of the priority document had not yet been received. A certified copy of the priority document, 10-2002-0040039, filed on July 10, 2002 will be submitted separately via U.S. mail.

Amendments to the Claims

Claims 1-7, 9-17, 19, and 21 have been amended to address claim objections based on informalities, correct typographical or grammatical errors or to more clearly disclose the invention. It is respectfully submitted that the amendments have support in the application as originally filed.

Objection to Specification

The Examiner objected to the specification due to informalities. Specifically, the Examiner indicated that the specification is replete with terms which are not clear, concise and exact, and required revision of the specification in order to comply with 35 U.S.C. § 112, first paragraph.

It is believed that the substitute specification submitted herewith addresses this objection. Accordingly, it is respectfully requested that the objection be withdrawn.

Objections to Claims

The Examiner asserts that there are translation errors throughout the claims. In addition, the Examiner objected to claim 2 due to informalities. Specifically, the Examiner asserted that claim 2 fails to further limit the independent claim references.

With this paper, claims 1-7, 9-17, 19, and 21 have been amended and it is believed that amendments to the claims address these objections. It is respectfully submitted that the grounds for objection have been overcome and it is respectfully requested that the Examiner withdraw the objection.

§ 112 Rejections

Claims 1, 8, and 18 were rejected under 35 U.S.C. § 112, second paragraph, and the Examiner asserted that the phrase "etc." or "such as" renders the claims indefinite.

With this paper, claims 8 and 18 have been canceled without prejudice. It is, therefore, respectfully submitted that the rejection is moot with respect to claims 8 and 18 and it is respectfully requested that the rejection be withdrawn.

In addition, claim 1 has been amended and does not recite the above-mentioned phrases. Accordingly, it is respectfully submitted that the grounds for the rejection have been overcome and it is respectfully requested that the Examiner withdraw the rejection.

§ 102 Rejections

Claims 1, 2, 5-8, and 16-21 were rejected under 35 U.S.C. § 102(e) as being anticipated by Nagaoka et al. ("Nagaoka" U.S. App. 2002/0180579 A1). Applicant

respectfully disagrees with the Examiner's interpretation of Nagaoka and respectfully traverses the rejection.

With this paper, claims 8, 18, and 20 have been canceled without prejudice. It is, therefore, respectfully submitted that the rejection is moot with respect to claims 8, 18, and 20 and it is respectfully requested that the rejection be withdrawn.

With regard to the rejection of independent claim 1, it is respectfully noted that the Examiner asserts, at paragraph 4 of the Office action, that Nagaoka discloses that "the control unit processes a possible service request, changing a service request from a remote access service unit into at least one UPnP message" at page 5 in paragraphs 0091, 0093, and 0095 and "the control processing unit changes a message from a UPnP device into a notification request in case of need and transmitting it to a remote access service unit" at page 5 in paragraphs 0092-0094.

Applicant's review of the cited portions in Nagaoka reveals that Nagaoka discloses "[e]ach home-located electronic device has a function to communicate with home server 61 via home bus 64" in paragraph 0091, "security system 63 detects that a window is broken...communicates with home server 61 via home bus 64. Security system 63 transmits notification of the emergency...to home server 61" in paragraph 0092, "[t]he communication standard for home server 61, home-located electronic device group 62, and security system 63 may be used on an optional basis. ...For example, ...UpnP (Universal plug and play)" in paragraph 0093, "[h]ome server 61 communicates with home network management facility 5 via mobile packet communication network 2, and controls home-located electronic device group 62 and security system 63" in paragraph 0094, and "home network management facilty 5 receives a control instruction for remote control from a user of terminal 1, ... and transmits the received control instruction to home server 61 in home network 6 via mobile packet communication network 2" in paragraph 0095.

It is respectfully noted that Nagaoka merely discloses the word "UpnP" as an example of the communication standard, but is silent as to how to apply the "UpnP" to a remote control system of a home network as in the presently claimed invention. Therefore, it is further respectfully submitted that nowhere in Nagaoka does it disclose or suggest "changing a service request from a remote access service unit into at least

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one UPnP (universal plug and play) message or changing a message from a UPnP device into a notification request; and transmitting the UpnP message or the notification request to the remote access service unit" as recited in claim 1.

Although claim 8 has been canceled, the rejection of claim 8 is discussed below since significant features of claim 8 have been incorporated into claim 5 to more clearly disclose the present invention and to further distinguish the present invention from the cited reference. With respect to the rejection of claim 8, the Examiner asserts, at page 7 of the Office action, that Nagaoka discloses "the profile database includes a screen size, type of input device, and provider network bandwidth" and cites paragraphs 0085 and 0133 to support the assertion. However, it is respectfully noted that the Examiner is silent as to disclosure in Nagaoka of a list of devices preferred by the user, a list of requested events, services available from the provider, and user access priority for each device, recited in original claim 8.

It is respectfully noted that a proper rejection for anticipation under § 102 requires complete identity of invention. The claimed invention, including each element thereof as recited in the claims, must be disclosed or embodied, either expressly or inherently, in a single reference. Scripps Clinic & Research Found. v. Genentech Inc., 927 F.2d 1565, 1576, 18 U.S.P.Q.2d 1001, 1010 (Fed. Cir. 1991); Standard Havens Prods., Inc. v. Gencor Indus., Inc., 953 F.2d 1360, 1369, 21 U.S.P.Q.2d 1321, 1328 (Fed. Cir. 1991).

Since the Examiner has not cited any disclosure in the text of the Nagaoka specification in connection with the above-mentioned elements recited in original claim 8, it is respectfully asserted that Nagaoka fails to anticipate the present invention as recited in original claim 8. It is respectfully submitted that claim 5, as amended, recites "the remote access service unit includes a profile database comprising: a list of devices preferred by the user; a list of requested events; performance of the remote access terminal including a screen size and a type of an input device; network provider's network bandwidth and services available from the provider; and user access priority for each device." It is further respectfully submitted that Nagaoka fails to disclose or suggest the features recited in claim 5, as amended.

Therefore, it is respectfully asserted that claim 5 is allowable over the cited reference.

With regard to the rejection of claim 16, it is respectfully submitted that original independent claim 16 has been amended to depend from allowable claim 5, and therefore, it is respectfully asserted that claim 16, as amended, is allowable at least by virtue of is dependence from the allowable base claim.

Although claim 18 has been canceled, the rejection of claim 18 is discussed below since significant features of claim 18 have been incorporated into claim 17 to more clearly disclose the present invention and to further distinguish the present invention from the cited reference. With respect to the rejection of claim 18, the Examiner asserts, at page 7 of the Office action, that Nagaoka discloses "the remote control system also includes a setup module for initializing the device control processing unit," citing paragraph 0152; "the profile database of the remote access service unit," citing paragraphs 0085, 0086, and 0133; and "a communication module having asynchronous notification function," citing Fig. 2 and paragraphs 0104-0106 to support the assertion.

Applicant's review of the cited portions of Nagaoka reveals that Nagaoka discloses that terminal performs a packet registration at mobile packet communication network to exchange packets via mobile packet communication network in paragraph 0152. Nagaoka also discloses that the communication capability of terminal 1 is determined by the maximum amount of data in a single reception, the size of the picture, the number of picture elements, the variations in colors and gradations, and the data format of the data which can be displayed in terminal in paragraph 0085. Nagaoka further discloses that terminal 1 comprises a memory function in paragraph 0086. Furthermore, Nagaoka discloses that the display capability, communication capability, and the communication standard corresponding to the model of terminal are provided in terminal information database in paragraph 0133.

Contrary to the Examiner's assertion, it is respectfully submitted that Nagaoka fails to disclose or suggest "a setup module for initializing the device control processing unit," recited in amended claim 17 because Nagaoka merely discloses a packet registration performed by a terminal, which is believed not to be equivalent to the setup module for initializing the device control processing unit. It is further respectfully submitted that Nagaoka fails to disclose or suggest "the profile database of the remote

access service unit," recited in claim 17 because Nagaoka merely discloses "terminal information database" and "communication capability" of the terminal.

In addition, it is respectfully noted that the Examiner is silent as to disclosure in Nagaoka of "asynchronous notification functions comprising e-mail, voice telephone, and SMS (short message service)," recited in original claim 18.

Although claim 20 has been canceled, the rejection of claim 20 is discussed below since significant features of claim 20 have been incorporated into claim 19 to more clearly disclose the present invention and to further distinguish the present invention from the cited reference. With respect to the rejection of claim 20, the Examiner's assertion, at page 5 of the Office action, is silent as to disclosure of "a remote access server which functions as a local CP (control point) and transmits a request to the remote control, or receives an answer from the remote terminal, wherein the remote access server is included in the local home network or an internet provider server," recited in original claims 19 and 20. In particular, it is respectfully submitted that Nagaoka fails to disclose or suggest at least the feature, "the remote access server is included in the local home network or an internet provider server," recited in claim 19, as amended

Therefore, it is respectfully asserted that independent claims 1, 5, 17, and 19 are allowable over the cited reference. It is further respectfully asserted that claims 2, 6, 7, 19, and 21, which depend from claim 1, 5, or 19, also are allowable over the cited reference.

§ 103 Rejections

Claims 3 and 4 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Nagaoka. This rejection is respectfully traversed.

It is respectfully asserted that claims 3 and 4 are allowable at least by virtue of their dependencies upon patentable independent claim 1.

Claims 9-15 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Nagaoka in view of Nassehi et al. ("Nassehi" U.S. Patent 5,081,622). This rejection is respectfully traversed.

Nassehi fails cure the deficiencies of Nagaoka with regard to "the remote access service unit includes a <u>profile database</u> comprising: <u>a list of devices preferred by the user</u>; <u>a list of requested events</u>; performance of the remote access terminal including a screen size and a type of an input device; network provider's network bandwidth and <u>services available from the provider</u>; and <u>user access priority for each device</u>," recited in claim 5. Therefore, claims 9-15 are allowable over Nagaoka and Nassehi.

It is respectfully asserted that claims 9-15 are allowable at least by virtue of their dependencies upon patentable independent claim 5.

CONCLUSION

In view of the above remarks, Applicant submits that claims 1-7, 9-17, 19, and 21 of the present application are in condition for allowance. Reexamination and reconsideration of the application, as originally filed, are requested.

No amendment made was related to the statutory requirements of patentability unless expressly stated herein; and no amendment made was for the purpose of narrowing the scope of any claim, unless Applicant has argued herein that such amendment was made to distinguish over a particular reference or combination of references.

If for any reason the Examiner finds the application other than in condition for allowance, the Examiner is requested to call the undersigned attorney at the Los Angeles, California telephone number (213) 623-2221 to discuss the steps necessary for placing the application in condition for allowance.

LEE, HONG, DEGERMAN, KANG & SCHMADEKA

Date: November 5, 2007

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A REMOTE CONTROL SYSTEM OF A HOME NETWORK

CROSS-REFERENCE TO RELATED APPLICATIONS

Pursuant to 35 U.S.C. § 119(a), this application claims the benefit of earlier filing date and right of priority to Korean Application No. 10-2002-0040039, filed on July 10, 2002, the contents of which are hereby incorporated by reference herein in their entirety.

TECHNICAL FIELD

The present invention relates to a home network, and in particular, to a remote control system of a home network using UPnP (universal plug and play).

BACKGROUND ART

With the development of Internet and digital technologies, researches on a in the field of home network for field connecting PCs, network devices, AV devices, electric home appliances, and home automation devices, etc. in a house have been actively performed active.

UPnP (universal plug and play) is one of influential industrial standards on a in the filed home network field, and many companies all over the world consist of belong to a UPnP forum.

In general, a UPnP network system consists of plural devices providing a

network service and a CP (control point) for controlling ~~the plural~~ a plurality of devices.

Herein, the CP is for controlling various devices, and the device can be a PC ~~contacted~~

connected to a home network and network devices, etc. Through the CP, a user

~~discoveries~~ discovers various devices, finds out their description and controls them.

On the other hand, the device transmits an event to the CP and provides a

presentation page to the CP, and accordingly, it is possible to control and grasp a state

of the device by using a web page.

First, a the UPnP protocol structure of a general UPnP architecture version 1.0

will be described with reference to accompanying FIG. 1.

FIG. 1 is an exemplary view illustrating a structure of ~~a~~ the UPnP protocol. As

depicted in FIG. 1, the UPnP protocol includes a network layer 111; a transport layer

112 having a UDP and a TCP; a presentation/session layer 113 having a protocol such

as HTTP, XML (extensible markup language), SOAP (simple object access protocol)

and SSDP (simple service discovery protocol), etc. and an architecture such as GENA

(generic event notification architecture); and an application layer 114 having information

related to a UPnP device, a ForumP and a provider, etc.

In a UPnP network system using the UPnP protocol, communication between the

CP and the device is performed by passing an addressing step for allocating an IP

address to the device; a determination ~~discovery~~ step ~~for making~~ by which the CP

determines the ~~discover~~ existence of the device; a description step ~~for making~~ by which

the CP ~~obtain~~ obtains service information supported by the device; a control step ~~for~~

~~calling~~ by which the CP calls a service of the device ~~by the CP~~; an event step for

notifying the CP of the device's ~~state variation~~ status change; and a presentation step

for presenting a state of the device and control information.

Among ~~those~~ these steps, the ~~discovery~~ determination step for ~~discovering~~

determining the existence of the device will be described in detail with reference to FIG.

2.

FIG. 2 is a ~~state~~ diagram illustrating actions involved in the ~~discovery~~

determination step of the UPnP network system. As depicted in FIG. 2, a device 221

performs multicasting of CPs 211, 212, a CP 213 transmits a search message to

devices 221, 222, and the device 222 responds.

First, in order to ~~discover~~ determine that the device exists, the CP performs the

~~device discovery~~ determination step by using the SSDP (simple service discovery

protocol). Accordingly, when the device 221 ~~contacts~~ connects to the UPnP network, it

performs multicasting of an advertisement message, and accordingly the CPs 211, 212

confirms existence of the device through a multicast message from the device 221.

~~And, when~~ When the CP ~~contacts~~ connects to the UPnP network, the CP 213

multicasts a search message, the device 222 receives the search message and

transmits related information ~~thereof~~ to the CP 113 by unicast. Herein, the CP uses the

SOAP (simple object access protocol) in order to control the device ~~contacted~~

connected to the UPnP network, and the CP uses the GENA (generic event notification

architecture) in order to receive the state event of the device.

However, in the present UPnP device architecture version 1.0, it is assumed that there are all construction partsall components of the home network are in a local network, and contact service in a remote place is not considered particularly. Because of that Therefore, when there is a contact service request from a remote place, it may not be supported. In more detail, when there is limitation due to bandwidth or processing performance of a remote terminal, UPnP message translation for a case having constraint due to a bandwidth or a processing performance of a remote terminal has to beshould be performed variously according to service types. However, a plan for how to perform mutual operation between a comparatively complicated device and a CP by a simple user command and event has not been presented.

In addition, in order to provide a home network service to various remote terminals, input/output to the remote terminal has to be separated from service contents, however However, a plan for performing itthis separation efficiently has not been suggested. For example, in case of a service using XML (extensible markup language), XML pages are generated regardless of kinds the type of a terminal, and only terminal display format is varied.

In the conventional art, in In a conventional home network using a standard which is not the UPnP home network but another standard, although access from a remote place to the home network can could be implemented, however there are following problems in this implementation.

First, because a user has to log in to a provider's network, ~~it~~ there may be a burden to the provider ~~in~~ with respect to the scalability ~~aspect~~. In more detail, because server capacity has to be increased according to increase of the number of users, ~~disutility~~ ineffectiveness may ~~be caused~~ result, processing time delay may result due to ~~occur by passing~~ a relay server, and the user may ~~have unpleasantness~~ feel uncomfortable ~~because of~~ providing the user's personal information to the provider.

In addition, when ~~a plural~~ plurality of users access simultaneously, collision may occur in the home network and devices, and ~~accordingly~~ thus, it may cause the users inconvenience because there is no clear collision solution.

~~TECHNICAL GIST~~ SUMMARY OF THE ~~PESENT~~ INVENTION

In order to solve the above-described problems, it is an object of the present invention to provide a remote control system of a home network capable of monitoring a state of devices connected to a home network and controlling the devices by using various terminals in a remote place.

~~In addition, in local home network techniques, it~~ It is another object of the present invention to provide a remote control system of a home network capable of controlling devices in a home network by ~~contacting~~ connecting to the home network from a remote place by using a device such as a mobile terminal or a personal computer using a web browser.

In order to achieve the above-mentioned objects, a remote control system of a home network in accordance with the present invention includes a local home network in-to which plural a plurality of devices are connected; a remote terminal for controlling the local home network in a remote place; and a remote access server having a functionacting as a local CP (control point) and facilitating communication with transmitting/receiving request/answer to/from the remote terminal.

The remote access server is included in a- the local home network or an Internet provider server, or can be constructed so as to have functions divided into a local home network and a provider server.

A remote control system of a home network includes a device control processing unit operated-operating as a CP (control point) for mutual operation with plural a plurality of devices and controlling the devices according to a service request from a remote terminal; a remote access service: unit for notifying the device control processing unit of the service request from the remote terminal; and a remote terminal service unit for converting the user request from the remote terminal into a service request, transmitting it to the remote access service unit and transmitting a response from the remote access service unit to a pertinent terminal.

Accordingly, when a web service request of a remote terminal is transmitted from a remote access service unit, the device control processing unit may convert converts-it into at least one UPnP message change format. When it-the service request can be processed with reference to a home network view of a pertinent local CP corresponded

corresponding to the remote terminal, the device control processing unit does not

perform UPnP message changeexchange. When it the device control processing unit is

required to respond to a UPnP message from the device, the device control processing

unit transmits a notification request to the remote access service unit.

The remote control system of the home network includes a remote access

service unit for receiving a user's web request from a remote terminal service unit;

transmitting it the web request to a device control processing unit by converting it into a

corresponded corresponding service request according to contents of the web request;

and transmitting a web response for a pertinent remote terminal to the remote terminal

service unit by having a service view consisting of a set of at least one web document.

The remote access service unit includes a profile database, determines a service

view of a remote access service according to service service-related information

recorded in a profile database, and provides various remote access services to a user

and a remote terminal with reference to the service view.

The profile database includes information such as a list of user's preferred

devicedevices list, a list of request requested event list events information related to,

performance of the remote access terminal, such as a screen size and a kind type of an

input device, a network provider provider's network bandwidth and providable

serviceservices available from the provider, and user access priority list listed by

devices. Herein, a A service view of the remote access service is determined according

to service service-related information recorded in the profile database, and, accordingly,

various remote access services can be provided.

The remote control system of a home network includes a remote terminal service unit for performing mutual communication, such as web request/response with a remote terminal by having a built-in web server, transmitting a web request from a user to a remote access service unit, and transmitting a web response as to a remote terminal in a form of a web document form generated with reference to a recent service view from at the remote access service unit to a remote terminal.

And, the The remote control system of claim 17 further includes a setup module for initializing the device control processing unit and the profile database of the remote access service unit; and a communication module having asynchronous notification functions such as e-mail, voice telephone and SMS (short message service), etc.

In addition, the remote access server is constructed to provide services to plural a plurality of remote terminals by having via a method for relaying a local CP of the device control processing unit with to a remote terminal and a plural method for simultaneously accessing the plurality of terminals simultaneous access method for by the remote access service unit.

In the The method for relaying a local CP of the device control processing unit with a remote terminal, there are is based on a method for having each a local CP for each remote terminal, a method for having one local CP in the device control processing unit, and a method for having a local CP by devices kinds for each type of device.

Because a home network view exists by terminalsfor each terminal, the method for having a CP by terminalsfor each terminal is simple and easy to implement.

In the method for To facilitate having one local CP in the device control processing unit, given that because a single home network view is used, there is a process for extracting information for each remote terminal. In that case, plural A plurality of remote terminals co-own (share) service requests, and one service result can be transmitted to the plural plurality of terminals.

In the method for To facilitate having a local CP by device kindsfor each type of device, it is possible to simplify each local CP, however. However, a process for extracting information for each service from the home network view by device kindsfor each type of the device is required.

For the plural terminals simultaneous access method To facilitate simultaneously accessing the plurality of terminals, a mechanism for solving collision in the local home network is included, specifically namely, a local home network collision solving mechanism for simultaneous access of the plural plurality of remote terminals is included.

The remote access service unit includes a home network collision solving mechanism performed in at a home network level, a device level, an operation level, or performed in mixing at both a device level with and an operation level. The home network collision solving mechanism performed in at the operation level solves a collision problem according to a user priority rank, a an order of remote access contact

~~order~~connection and an order of -operation ~~order~~.

The home network collision solving mechanism is stored in the device access

database ~~in~~ included the profile database.

Other objects, characteristics and advantageous of the present invention will

become clear through detailed descriptions with reference to accompanying drawings.

BRIEF DESCRIPTION OF DRAWINGS

The accompanying drawings, which are included to provide a further

understanding of the invention and are incorporated in and constitute a part of this

specification, illustrate embodiments of the invention and together with the description

serve to explain the principles of the invention.

In the drawings:

FIG. 1 is an exemplary view illustrating a structure of a UPnP protocol;

FIG. 2 is a state diagram illustrating a determination ~~discovery~~ step for

determining ~~discovering~~ existence of a device by CPs (control point) in a UPnP network;

FIG. 3 is a block diagram illustrating a remote control system of a home network

in accordance with the present invention;

FIG. 4 is a block diagram illustrating a remote access server in accordance with

the present invention;

FIG. 5 is a flow chart illustrating UPnP conversion processes using a single clock

point;

FIG. 6 is an exemplary view illustrating a device access database in accordance with the present invention; and

FIG. 7 is a detailed block diagram illustrating the remote access server in FIG. 4.

DETAILED DESCRIPTION OF THE INVENTION

Hereinafter, the preferred embodiments of a remote control system of a home network in accordance with the present invention will be described with reference to accompanying drawings.

FIG. 3 is a block diagram illustrating a remote control system of a home network in accordance with the present invention.

As depicted in FIG. 3, the remote control system of the home network in accordance with the present invention includes a home network part portion in which a PC 311, a refrigerator 312, a TV 313 and an Internet gateway 314 are connected to a UPnP network; a provider network part portion in which provider servers 321, 322 are connected to the Internet; and a remote terminal part portion having a radio terminal 331 and a user PC 332.

A remote access server exists in the PC 311 or the Internet gateway 314 on the home network, and the remote access server transmits a state of the plural plurality of network devices to a user in a remote place by controlling the plural plurality of network devices upon by receiving a user command.

In the remote control system of the home network in accordance with the present

invention, it is assumed that the provider servers 321, 322 have no function or have a very minute function limited function.

Because the remote server contact connection and web document service are performed in the remote access server located in a house, the only function that the remote access server is requested byneeds from the outside only to notify is notifying the outside of a DNS (domain name server) or an IP address thereof.

In a fixed IP or a static DNS mode, it is possible to construct the remote access server as in static configuration, and the provider's function is unnecessary.

On the other hand, in a variable IP or a dynamic DNS, although the provider's function is necessary. However, it Tthe role is very limited minute in comparison with the conventional provider-based remote access service.

Accordingly, in the remote control system of the UPnP home network in accordance with the present invention, by using plural a plurality of remote terminals supporting web browsing according to the UPnP device architecture version 1.0 standard, operation of the remote access server, facilitates efficiently performable efficient performance of various remote access services of for the home network will be described.

First, the The remote access server presented by the remote control system of the home network in accordance with the present invention includes the web server, and has functions for processing all remote services from user log-in to user log-out. In that case, as As described above, the remote access server receives help of from the

provider only ~~in~~ for a problem related to an IP ~~pr~~ or a DNS address.

The remote access service can be divided into a control ~~flow~~ process and a notification process ~~flow~~. Herein, the control process refers to ~~flow means a flow for~~ transmitting a web request of the user to a device control processing unit and responding to the web request, and ~~In the meantime,~~ the notification process refers to ~~flow means a flow for~~ converting a ~~discovery~~ determination message or an event message ~~discovered~~ generated in the UPnP device into a notification request and ~~reflecting it on~~ indicating the message in the web document

In the present invention, it is assumed the remote terminal has only a web browsing function, notification of contents by the remote terminal is ~~reflected~~ indicated in web documents, web documents are updated periodically by the web browser having an automatic updating function, or the user checks new web documents by himself/herself.

If it is possible for a remote terminal to support the system ~~by the remote terminal~~, a method for notifying the remote terminal of a UPnP device message asynchronously, such as through an e-mail, ~~etc.~~ can be used.

FIG. 4 is a block diagram illustrating a remote access server in accordance with the present invention. As depicted in FIG. 4, the remote access server includes a device control processing unit 430; a remote access server unit 420; and a remote terminal service unit 410. It is assumed that the remote access server is loaded in the Internet gateway 314 in FIG. 3.

The device control processing unit 430 ~~mutually~~ communicates with the remote

access service unit 420 by an API (application program interface) or other interface

methods while simultaneously ~~mutually~~ operating with home network devices, ~~namely,~~

such as the PC 311, the refrigerator 312 and the TV 313 in FIG. 3, by using UPnP

protocol messages. ~~Herein, the~~ The core of the device control processing unit 430 is the

UPnP CP.

In the present invention, it is possible to have a ~~each~~ UPnP CP ~~by~~ for each ~~the~~

~~same kind~~ type of ~~devices~~ device, to allocate a ~~each~~ UPnP CP to each remote terminal

in service or ~~and~~ to have only one UPnP CP.

In general, a specific CP can control only one specific ~~(specific) kind~~ type of

device ~~devices~~, and a common CP can control all UPnP devices~~,~~. ~~however~~ However,

their functions ~~thereof is~~ are limited.

~~In case of having each~~ When there is a UPnP CP ~~by~~ for each ~~the same kind~~ type

of device ~~devices~~, each CP controls the same type of devices ~~of that kind~~, and

construction of each CP can be more simplified ~~in comparison~~ than with the other ~~rest~~

~~two~~ cases. ~~In that case, it~~ It is required to perform distributing requests from the

remote terminal according to ~~kinds~~ the types of devices, and provide ~~returning back~~

information transmitted from the UPnP device to the remote terminal connected to each

device.

~~In the meantime, when~~ When a CP is allocated to each remote terminal, it is

easy to link the remote terminal with the device~~, however~~. However, all devices to be

controlled by each remote terminal ~~have to~~must have a CP function.

~~Lastly, when~~ When there is only one CP, it is required ~~to make~~that the CP ~~have~~ has a function capable of controlling all kinds of devices and ~~connect~~connects ~~relay~~a device ~~to~~ ~~with~~a remote terminal. However, ~~in~~ when providing ~~of~~a service to ~~plural~~a plurality of remote terminals, it is possible to reduce the number of UPnP message exchanges by using a service for other terminals.

~~In case of~~When using a ~~heavy~~CP ~~controllable plural~~which can control a plurality of devices, flexible configuration of a CP using, for example, Internet download~~, etc.~~ is assumed.

When a single CP is allocated to the device control processing unit 430, requests from ~~plural~~a plurality of remote terminals can be efficiently satisfied. In more detail, when two users make ~~ask for a~~similar ~~kind of~~requests, those requests are unified~~,~~ and ~~it is~~mutually ~~operated~~performed with a pertinent device.

For example, when a user 1 subscribes for an event of a state variable A ~~of~~from a device 1 ~~from~~between one o'clock ~~to~~and two o'clock, and a user 2 subscribes for an event of a state variable A ~~of~~from a device 1 ~~from~~between one thirty ~~to~~and three o'clock, the device control processing unit 430 performs the service for ~~the~~ user 2 by using the event for ~~the~~user 1 for ~~fir~~the first thirty minutes~~, then,~~. Then the device control processing unit 430 performs the pertinent service for ~~the~~user 2 through event subscription for the ~~rest~~remaining one hour.

Accordingly, when the single device control processing unit is used, it is possible

to ~~save~~ reduce traffic of the home network and avoid problems ~~cased~~ caused by

multiple CPs.

When the device control processing unit 430 includes a single CP, UPnP

conversion is performed by the steps shown in FIG. 5. FIG. 5 is a flow chart illustrating

UPnP conversion processes for the single device control processing unit.

Herein, it is assumed that requests from the remote access service unit 420 ~~is~~

~~orderly~~ are stored in the order received and processed in a UPnP service request queue.

In addition, it is assumed that there is a ~~certain~~ service request table in which a present

proceeding service request is stored~~,~~ and in which a service number item is included ~~in~~

~~the service request table~~.

First, it is ~~judged~~ determined whether there is a service request ~~(~~ when the UPnP

service request queue is empty as shown at step S501~~, in the judging result,~~

~~when~~ When it is determined that the UPnP service request queue is not empty, the

present service request is compared with the service request table as shown at step

S502.

~~Afterward, it~~ It is ~~judged~~ then determined whether there is a newly requested

service in the service request table. In more detail, it is ~~judged~~ determined whether the

existing service request ~~accepts~~ is similar to the newly requested service as shown at

step S503. ~~In the judging result, when~~ When it is determined that the newly requested

service is not similar to ~~in~~ the existing service request table, the newly requested service

is recorded in the request table ~and, if necessary, the device control processing unit 430 transmits an appropriate UPnP message as shown at step S506.

On the other hand, in the judging result, when it is determined that the existing service request there is a service similar to the newly requested service in the service request table, it is judged determined whether it is possible to accept a new the existing service request accepts the newly requested service completely as shown at step S504. In the judgement result, whenWhen it is determined that it is possible to the existing service request can accept the newly requested service request completely, the newly requested service is added to the existing service request table by adding (a new service number is added to the service request table), in case of need and, if necessary, the device control processing unit 430 transmits an appropriate UPnP message as shown at step S507.

On the other hand, in the judging result, when it is determined that it is not possible to the existing service request can not accept the newly requested service completely, the service request in the service request table is adjusted in consideration of parts portions not accepted in the existing service request ~and the device control processing unit 430 transmits an appropriate UPnP message in case of need, if necessary, as shown at step S505.

In the meantime, in the judging result in the step S501, when it is determined that the UPnP service request queue is empty, it is judged determined whether the UPnP

conversion process is finished as shown at step S508, and it is determined to finish the

UPnP conversion process or start the UPnP conversion process again according to the

~~judging result~~determination.

Afterward, the above-described UPnP conversion process is performed

repeatedly.

~~Herein, each~~Each CP of the device control processing unit 430 includes a home

network view. ~~Form of the~~The home network view can be implemented ~~variously~~in

various forms. Generally, it consists of information such as a device list controlled by the

UPnP CP and a ~~subscribed~~subscribing event list, ~~etc.~~ which is same as a state of each

device. In addition, when there is a single CP ~~is constructed as single~~or ~~by~~a CP for

each type of device ~~kinds~~, the home network view can be efficiently used ~~in providing~~

~~of~~for providing a service to another remote terminal by using a service request of one

remote terminal.

As described above, the UPnP ~~passes~~involves steps such as addressing,

discovering, describing, control, event and presentation. Herein, message exchange is

included in each step~~,~~ and messages can be largely divided into a command from the

CP and a notification from the device.

The command from the CP includes a multicast-search HTTPMU (HTTP

multicast over UDP) in the discovering step, a HTTP GET message in the describing

step, an action and query variable SOAP (simple object access protocol) message in

the control step, a subscription GENA (generic event notification architecture) format

message in the event step and a HTTP GET message in the presentation step.

The notification from the device includes an advertisement response unicast message in the determining discovering step and an event GENA format message in the event step. And, theThe addressing step is a pre-step for starting UPnP, and messages exchanged in the addressing step are not UPnP messages.

UPnP conversion is performed in the device control processing unit 430, and the conversion format form is different according to servicesdepending on the service.

Ultimately, the UPnP conversion is for solving differences difference between the home network view of the device control processing unit and the service view of the remote access service unit 420. For example, a web request occurs by one click of the user in the web page, and it is converted into a service request. However, when useful information is already exist in the home network view by a service request of another remote terminal, UPnP operation does not occur.

In case of needWhen it is necessary, the device control processing unit 430 updates the home network view by comparing determination discovery or event from the UPnP device with the present home network view, and transmits a notification request to the remote access service unit 420.

The remote access service unit 420 receives the user's web request from the remote terminal service unit 410, transmits the request to the device control processing unit 430 after converting the request into a service request format appropriate to for the device control processing unit 430, receives information about a state of the UPnP

device from the device control processing unit 430, and transmits the information to the

remote terminal service unit 410 to transmit it for transmission to the remote terminal.

According to the contents, The the user's web request is converted into a service

requestrequests such as for starting remote access service start, operation of a device

operation, update of the device state grasp, device event subscription, and ending

remote access service end according to contents. In addition, the remote access

service unit 420 receives a notification request from the device control processing unit

430, and updates a related service view thereof in case of needwhen it is necessary.

Each remote service managed by the remote access service unit 420 has each a

respective service view. In addition, the service view shows the home network on the

user's remote terminal, and it consists of web documents of therelated to the home

network to be controlled by the user such as a device state, a control page, a device list

page and a user option page, etc.

The remote access service unit 420 varies changes a service view according to,

for example, variation of the home network view, result of the user control command,

and a user's option change, etc., and the. The service view is implemented generated

as a form of active web page generation. For that, the The remote access service unit

420 includes a document generator for making contents to be transmitted for

transmission to the user as web documents, such as XML.

The remote access service unit 420 stores and maintains a service profile database

having categories, such as user, terminal type, and Internet connection type, etc.

The profile database has static configuration, or it can be updated by using an option page of the service view after the user is connected to the remote access service. In addition, the profile database includes information such as a list of the user's preferred device list of the userdevices, a list of request requested events event list, performance of the remote access terminal, such as a screen size and an input device kind, bandwidth and providing service ofservices provided from the user network, and user access priority by for UPnP devices. The service view and the UPnP conversion form format are continually influenced by varied according to the information while the service is proceededin progress.

Whenever the remote terminal requests a service, the remote access service unit 420 can allocate one service module and can include one integrated service module. Under all circumstances, a device access database for supporting simultaneous access of plural users has to be existedmust be present in the profile database.

The device access database includes data, such as each user's priority rank or access probability, etc. according to a share (collision) level by of the users, devices, or device's operationsoperations in the devices.

In addition, a form type of the device access database is determined according to a device access policy by specific implement for a particular implementation.

The device access database according to the device access policy will be described in more detail with reference to accompanying FIG. 6.

FIG. 6' is FIGS. 6(a)-(d) are an exemplary view views illustrating the device access database used in the remote access server. FIG. 6(a) is an exemplary view illustrating the device access priority list table according to the above-mentioned device access policy. FIG. 6(b) is an exemplary view illustrating a share type table according to device by device's operations and according to the above-mentioned device access policy[[.]]. FIG. 6(c) is an exemplary view illustrating authority by according to priority lists, and. FIG. 6(d) is an exemplary view illustrating authority according to by users about and operations supported by the device.

First, The policy regarding device simultaneous access to a device policy consists of several following rules.

1. There is a use priority list by users.

2. It is determined displayed whether the device is exclusive at every operation.

3. When collision occurs at during an operation of the exclusive device, the collision is solved according to the user priority rank.

4. In case of the same priority rank, priority is given to a user starting operation first.

5. Although Even if the priority of a new user is higher, an existing operation cannot can not be stopped while the operation is performed.

The device access priority rank list in FIG. 6(a) records a priority list by according to users about for all devices in the home network.

As shown in FIG. 6(a), in the device access priority rank list, a priority rank of the device 1 is allocated to users in the order of ~~a~~ user C, ~~a~~ user B and ~~a~~ user A. In more detail, when a communication from ~~the~~ user A collides with a communication from ~~the~~ user C in the device 1, ~~the~~ user C has priority.

As shown in FIG. 6(b), a share type table according to device ~~by device's~~ operations shows share types of ~~the~~ device 2. Herein, operations 1 and 3 indicate access ~~of~~ by other users is impossible while a pertinent operation is being performed.

FIG. 6(c) is an exemplary view showing access authority according to ~~by~~ priority ranks ~~about~~ of operations of each device~~, when~~. When a priority rank is 1, authority is given to all operations~~,~~. ~~when~~ When a priority rank is 2, authority is given only to an operation 3~~, when~~. When a priority rank is 3, authority is given only to an operation 2.

~~In the meantime, as~~ As described above, there is a method for providing authority by users regardless of the priority rank.

FIG. 6(d) is an exemplary view showing authority according to ~~by~~ users ~~about~~ ~~device's~~ and device operations~~, as~~. As shown in FIG. 6(d), ~~the~~ device 2 provides authority ~~about~~ for each operation by users.

Examples in ~~FIG. 6~~ FIGS. 6(a)-(d) show simultaneous access in the device operation level~~, herein, it~~. It is also possible to perform simultaneous access control in the device unit or the home network unit. In addition, it is also possible to perform simultaneous access control by compromising the device unit and the operation unit.

For example, it is possible to perform access control to ~~the~~ device 1 ~~in~~ at the device level and perform access control to ~~the~~ device 3 ~~in~~ at the operation level. In more detail, when a collision occurs, the collision can be solved by ~~using methods such as a method for~~ considering a user having higher priority, ~~a method for~~ considering a user starting the remote access service first, and ~~a method for~~ considering a user starting a specific operation of a specific device first~~, etc~~.

Of course, there can be other collision solving methods ~~for~~, such as those considering mixing priority, remote service access order, and operation order. Herein, a collision solving method according to priority rank is performed between the users having different priority ranks, and a collision solving method according to ~~for considering~~ a user starting an operation first is performed between the users having the same priority rank.

Policy for collision solving mechanism can have various forms and complexities ~~according to~~ depending on share units and collision solving methods.

In FIG. 4, the remote terminal service unit 410 communicates with the remote terminal ~~as~~ in a web request/response mode~~,~~. ~~in~~ In a control process ~~flow~~, ~~it~~ the remote terminal service unit 410 transmits a user's request to the remote access service unit 420 and transmits web documents from the service unit 420 to the user ~~as~~ in a web ~~responseing~~ response mode.

In a notification process ~~flow~~, the remote terminal service ~~is~~ ~~corresponded~~ corresponds to web browser automatic update or user confirmation by

providing a new web document to the user.

The remote terminal service unit 410 includes a built-in web server and a space for storing web documents. In the web document storing space, a-style ~~document~~ documents for various remote terminals can be stored by ~~being~~ ~~synchronized~~synchronizing with the profile database of the remote access server. For example, ~~in use of~~when using XML, ~~a~~-an XSL stylesheet is stored in the web document storing space, and the XSL stylesheet can be applied to the remote terminal before transmitting the XML document to the remote terminal.

The event from the UPnP device can be transmitted to the user as e-mail, SMS, ~~and~~-or voice telephone~~, for that, the~~-. The remote terminal service unit 410 has to include pertinent modules because of this.

FIG. 7 is a detailed block diagram of the remote access server~~,~~-. ~~as~~-As depicted in FIG. 7, the remote access server consists of the remote terminal service unit 410; the remote access service unit 420; the device control processing unit 430; and the setup module 440 for static configuration and setup.

~~Herein, the~~-The device control processing unit 430 includes the UPnP integrated CP module 431. In addition, the remote access service unit 420 includes the service branch module 421; the service module 422; the UPnP conversion module 423; the profile database 424, and the XML module 425 as ~~the~~-a character generator.

The remote terminal service unit 410 includes the web server module 411, the XML document DB 412, and the e-mail module 413.

~~In order to control all kinds of devices of the device control processing unit 430,~~ ~~the~~The setup module 440 has functions for controlling many kinds of devices, such as a download function for statically configuring the UPnP integrated CP module 431 ~~statically~~, which is in the device control processing unit 430. The setup module 440 also has functions, such as for initializing and updating the profile database 424 of the remote access service unit 420.

The profile database 424 has a device access database.

The remote access service unit 420 generates each service module 422 for each connected remote terminal and provides a remote access service. However, only an integrated CP is shown in the UPnP network as the one and only remote access CP.

The service branch module 421 of the remote access service unit 420 performs generation and collection of the service module 422 according to ~~connection and end~~ ~~request of the user~~the user's requests for connecting and ending, transmits web requests to a pertinent service module and transmits a notification request ~~arrived~~ received from the service module to the e-mail module 413 of the remote-access service unit 410. In more detail, it is assumed that the remote terminal having a function for processing asynchronous notification is supported.

~~In that case, the~~ The remote access server, which is operated ~~as~~ based on XML ~~basis, it~~ generates required XML documents dynamically in the XML module 425 ~~corresponded~~ corresponding to the document generator of the remote access service unit 420 in a general model, and ~~services it~~provides the XML documents to the user. In

addition, the remote access server performs services ~~easily~~ to various terminals by

using, for example, the XSL stylesheet according to the device terminal and the ~~user~~

user's taste~~, etc~~.

~~In the meantime, in~~ In the embodiment of the present invention, ~~control and~~

~~check~~ controlling and checking of the home network devices and accessing ~~to~~ the home

network from a remote place have been described-. ~~on the basis of that~~ Based on the

described embodiment of the present invention, more services can be ~~performed~~

provided as ~~following~~ follows.

1. When a user stays away from home for a long time, it is possible to manage a

specific home network ~~in~~ from a remote place. It can be performed easily when the

remote access server describes the home network as XML documents.

2. In a method for managing the home network devices by a manufacturing

company selling them, selection ranges can be increased. In the ~~convention~~

conventional method, when there is a need to report a device state to ~~a~~ the

manufacturing company, ~~mainly~~ the device ~~performs~~ requests a connection ~~request~~ to

the home network and ~~notifies it~~ reports the need through the Internet connection.

However, the manufacturing company can access to the device periodically, for

example, ~~once in~~ every six months, ~~the manufacturing company can access to the~~

~~device~~ and check ~~a~~ the state of the device. In that case, it is assumed that the user

provides a limited home network access right to the manufacturing company. ~~It means~~

and there is no need to implement a manufacturing company report function for the

home network device, and accordingly . Accordingly, it can be used efficiently for

maintaining efficient maintenance and management of managing a low price light

devicelow-priced simple devices is possible.

3. There is application possibility to apply it toThe home network can be applied

to web services. When If representation the communication of the home network is

performed as in XML (as one of web service standards), it is possible to construct a

service providable, which may be available to the outside, and other application

possibilitykinds of applications is are possible very high.

INDUSTRIAL APPLICABILITY

As described above in detail, in the The present invention, by making a light

remote terminal having various kinds of web browsing functions for access to the UPnP

home network in from a remote place, there are following search advantages.

First, in the present invention, it is possible to provide a customized custom tailed

service according to a kindthe type of a remote terminal, user preference, and network

environment.

In addition, in the present invention, when plural terminals attempt to access to

the home network simultaneously, it is possible to process the access attempts it

efficiently and solve collision occurable collisions which can occur in the home network

devices.

In addition, in the present invention, because only web browsing function is

required for the remote terminal and there is little requirement, supply is very easy.

As the present invention may be embodied in several forms without departing from the spirit or essential characteristics thereof, it should also be understood that the above-described embodiments are not limited by any of the details of the foregoing description, unless otherwise specified, but rather should be construed broadly within its spirit and scope as defined in the appended claims, and therefore all changes and modifications that fall within the metes and bounds of the claims, or equivalence of such metes and bounds are therefore intended to be embraced by the appended claims.

Abstract

A remote control system of a home network includes a local home network to which plural a plurality of devices are connected; a remote terminal for controlling the local home network from a remote place; and a remote access server having a function offunctioning as a local control point and transferring and receiving request/response to and from the remote terminal. States of equipments connected to the home network can be monitored and controlled by using various terminals.